

We claim:

1 1. A composition for donor organ preservation for transplantation comprising a
2 crystalloid based solution of constituents including PEG-Hb, one or more physiologically
3 essential electrolyte, at least one soluble protein, at least one nutritional formulation, and
4 at least one agent acting on the cardiovascular system.

1 2. The composition of claim 1 where said electrolyte comprises MgSO_4 , KCl,
2 CaCl_2 , NaCl, NaHCO_3 , and Na_2HPO_4 , NaH_2PO_4 or both.

1 3. The composition of claim 1 where said at least one soluble protein comprises
2 human albumin.

1 4. The composition of claim 1 where said at least one soluble protein comprises
2 human insulin.

1 5. The composition of claim 1 where said at least one nutritional formulation
2 comprises a simple sugar.

1 6. The composition of claim 5 where said simple sugar comprises dextrose.

1 7. The composition of claim 1 where said at least one nutritional formulation
2 comprises a carbohydrate and its metabolites.

1 8. The composition of claim 1 where said at least one nutritional formulation
2 comprises an antioxidant.

1 9. The composition of claim 8 where said antioxidant is at least one selected
2 from the group comprising glutathione, lipoic acid, N-acetyl cysteine, tocopherols, ascorbic
3 acid, L-thiazolidine-2-one-4-carboxylic acid.

1 10. The composition of claim 1 where said at least one agent acting on the
2 cardiovascular system comprises heparin sodium.

1 11. The composition of claim 1 where said at least one agent acting on the
2 cardiovascular system comprises lidocaine HCl.

1 12. The composition of claim 1 where said crystalloid based solution comprises
2 approximately 3% PEG-Hb by volume.

1 13. The composition of claim 1 where at least one of the constituents comprises
2 one selected from the group of KCl (4.7 mEq/L), NaCl (148.7 mmol/L), $\text{Na}_2\text{HPO}_4/\text{NaH}_2\text{PO}_4$
3 (2.5 mmol/L), NaHCO_3 (2.5 mmol/L), MgSO_4 (5.0 mEq/L), CaCl_2 (1.0 mEq/L), lidocaine
4 HCl (12.5 mg/L), heparin sodium (1250 units/L), dextrose (6.1 mOsm/L), human albumin
5 (1.5 gm/L), human insulin (30.6 units/L), 0.3M tromethamine (THAM) solution (7.3 cc/L).

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2 14. The composition of claim 1 wherein said crystalloid based solution has a pH
3 maintained at 7.1 as measured at 37°C.

1 15. The composition of claim 1 wherein crystalloid based solution has a pH
2 maintained at 7.4 as measured at 20°C.

1 16. The composition of claim 1 where crystalloid based solution is used for *ex*
2 *vivo* preservation of donor organ allografts during transportation for the purpose of
3 transplantation.

1 17. The composition of claim 1 where said crystalloid based solution is used for
2 *in vivo* myocardial preservation during open-heart surgery.

1 18. The composition of claim 1 where said crystalloid based solution is used as a
2 blood substitute or blood replacement.

1 19. The composition of claim 1 where said crystalloid based solution is modified
2 to increase the potassium concentration to reflect intracellular levels for the purposes of
3 achieving cardioplegia or hypothermic cardiac arrest.

1 20. A composition for donor organ preservation for transplantation comprising a
2 polyethylene glycol substituted bovine hemoglobin based solution for the purpose of *ex*
3 *vivo* donor organ preservation to preserve donor human and animal organs, *ex vivo*, prior
4 to transplantation.

1 21. The composition for donor organ preservation of claim 20 where said
2 polyethylene glycol substituted bovine hemoglobin based solution comprises PEG-Hb, and
3 at least one of the constituents selected from the group of human albumin, dextrose,
4 heparin sodium, lidocaine HCl, MgSO₄, KCl, CaCl₂, 0.3M tromethamine (THAM) solution,
5 NaCl, NaHCO₃, and Na₂HPO₄/NaH₂PO₄.

1 22. The composition for donor organ preservation of claim 21 where said
2 polyethylene glycol substituted bovine hemoglobin based solution comprises
3 approximately 3% PEG-Hb by volume.

1 23. The composition of claim 22 where at least one of the constituents comprises
2 one selected from the group of KCl (4.7 mEq/L), NaCl (148.7 mmol/L), NaH₂PO₄/Na₂HPO₄
3 (2.5 mmol/L), NaHCO₃ (2.5 mmol/L), MgSO₄ (5.0 mEq/L), CaCl₂ (1.0 mEq/L), lidocaine
4 HCl (12.5 mg/L), heparin sodium (1250 units/L), dextrose (6.1 mOsm/L), human albumin
5 (1.5 gm/L), human insulin (30.6units/L), 0.3M tromethamine (THAM) solution (7.3 cc/L).

1 24. A composition for donor organ preservation for transplantation of a donor
2 organ comprising an oxygen, nutritional and electrolyte environment for tissue of said
3 donor organ to provide *ex vivo* preservation such that said donor organ regains acceptable
4 function post transplantation.

1 25. The composition for donor organ preservation of claim 24 where said
2 oxygen, nutritional and electrolyte environment comprises PEG-Hb, and at least one of the
3 constituents selected from the group of human albumin, dextrose, heparin sodium,

4 lidocaine HCl, MgSO₄, KCl, CaCl₂, 0.3M tromethamine (THAM) solution, NaCl, NaHCO₃,
5 and Na₂HP0₄/NaH₂P0₄.

1 26. The composition for donor organ preservation of claim 24 where said
2 oxygen, nutritional and electrolyte environment comprises approximately 3% PEG-Hb by
3 volume.

1 27. The composition of claim 24 where at least one of the constituents comprises
2 one selected from the group of KCl (4.7 mEq/L), NaCl (148.7 mmol/L), Na₂HP0₄/NaH₂P0₄
3 (2.5 mmol/L), NaHCO₃ (2.5 mmol/L), MgSO₄ (5.0 mEq/L), CaCl₂ (1.0 mEq/L), lidocaine
4 HCl (12.5 mg/L), heparin sodium (1250 units/L), dextrose (6.1 mOsm/L), human albumin
5 (1.5 gm/L), human insulin (30.6units/L), 0.3M tromethamine (THAM) solution (7.3 cc/L).

1 28. A method for harvesting donor organs comprising:
2 excising said donor organ;
3 perfusing said donor organ with a normokalemic hypocalcemic bovine PEG-Hb
4 based solution; and
5 preserving said donor organ at a temperature for a predetermined time while
6 continuing perfusion with said normokalemic hypocalcemic bovine PEG-Hb based solution
7 in an oxygenated environment.

1 29. The method of claim 28 where preserving said donor organ in an oxygenated
2 environment comprises oxygenating said normokalemic hypocalcemic bovine PEG-Hb
3 based solution with 95%O₂/5%CO₂.

1 30. The method of claim 28 where perfusing said donor organ with a
2 normokalemic hypocalcemic bovine PEG-Hb based solution comprises continuously
3 perfusing PEG-Hb, and at least one of the constituents selected from the group of human
4 albumin, dextrose, heparin sodium, lidocaine HCl, MgSO₄, KCl, CaCl₂, Tromethamine
5 (THAM) solution, NaCl, NaHCO₃, and Na₂HP0₄/NaH₂P0₄.